

**We claim:**

1.-27. (Canceled)

28. (Currently amended) A tubular structure having an aspect ratio of about 3 or more and comprising an interior surface, said interior surface comprising a gaseous deposition product comprising a substantially uniform amorphous carbon coating comprising a thickness of about ~~[[5]]~~2 micrometers or more, wherein said coating comprises a hydrogen concentration of about 32 %.

29.-30. (Canceled).

31. (Previously presented) The tubular structure of claim 28 wherein said coating comprises a thickness of about 5 micrometers or more.

32. (Previously presented) The tubular structure of claim 28 wherein said coating comprises a thickness of about 15 micrometers or more.

33.-34. (Canceled).

35. (Previously presented) The tubular structure of claim 31 wherein said substantially uniform coating comprises a coating thickness comprising a uniformity of about +/- 20% or less along its length.

36. (Currently amended) The tubular structure of claim ~~[[32]]~~28 wherein said substantially uniform coating comprises a coating thickness comprising a uniformity of about +/- 20% or less along its length.

37. (Canceled).

38. (Previously presented) The tubular structure of claim 28 wherein said coating comprises a nanohardness of about 15 GPa measured using a nano-indentation hardness tester.

39. (Previously presented) The tubular structure of claim 31 wherein said coating comprises a nanohardness of about 15 GPa measured using a nano-indentation hardness tester.

40. (Previously presented) The tubular structure of claim 32 wherein said coating comprises a nanohardness of about 15 GPa measured using a nano-indentation hardness tester.

41.-44. (Canceled).

45. (Currently amended) A tubular structure having an aspect ratio of about 6 or more and comprising an interior surface, said interior surface comprising a gaseous deposition product comprising a substantially uniform amorphous carbon coating having a thickness of about 2 micrometers or more, wherein said interior surface comprises one or more metal and a sequential gradient comprising:

silicon chemically bonded to said metal, forming a metal-silicide;  
silicon cohesively bonded to said metal-silicide;  
carbon chemically bonded to said silicon, forming silicon-carbide; and  
carbon cohesively bonded to said silicon-carbide forming said substantially uniform  
amorphous carbon coating.

46.-47. (Canceled).

48. (Previously presented) The tubular structure of claim 45 wherein said coating has a thickness of about 5 micrometers or more.

49. (Previously presented) The tubular structure of claim 45 wherein said coating has a thickness of about 15 micrometers or more.

50. (Canceled).

51. (Currently amended) A tubular structure having an aspect ratio of about 6 or more and comprising an interior surface, said interior surface comprising a gaseous deposition product comprising a substantially uniform amorphous carbon coating having a coating thickness of about 2 micrometers or more and comprising a uniformity of about +/- 20% or less along its length, wherein said interior surface comprises one or more metal and a sequential gradient comprising:

silicon chemically bonded to said metal, forming a metal-silicide;  
silicon cohesively bonded to said metal-silicide;  
carbon chemically bonded to said silicon, forming silicon-carbide; and  
carbon cohesively bonded to said silicon-carbide forming said substantially uniform  
amorphous carbon coating.

52. (Currently amended) The tubular structure of claim 48 wherein said substantially uniform amorphous carbon coating comprises a coating thickness comprising a uniformity of about +/- 20% or less along its length.

53. (Currently amended) The tubular structure of claim 49 wherein said substantially uniform amorphous carbon coating comprises a coating thickness comprising a uniformity of about +/- 20% or less along its length.

54. (Currently amended) A tubular structure having an aspect ratio of about 6 or more and comprising an interior surface, said interior surface comprising a gaseous deposition product comprising a substantially uniform amorphous carbon coating having a thickness of about 0.5 micrometers or more and comprising a nanohardness of about 15 GPa measured using

a nano-indentation hardness tester, wherein said interior surface comprises one or more metal and a sequential gradient comprising:

silicon chemically bonded to said metal, forming a metal-silicide;

silicon cohesively bonded to said metal-silicide;

carbon chemically bonded to said silicon, forming silicon-carbide; and

carbon cohesively bonded to said silicon-carbide forming said substantially uniform amorphous carbon coating.

55. (Canceled).

56. (Previously presented) The tubular structure of claim ~~[[48]]~~51 wherein said coating comprises a nanohardness of about 15 GPa measured using a nano-indentation hardness tester.

57. (Previously presented) The tubular structure of claim ~~[[49]]~~45 wherein said coating comprises a nanohardness of about 15 GPa measured using a nano-indentation hardness tester.

58.-59. (Canceled).

60. (Currently amended) The tubular structure of claim ~~[[48]]~~45 wherein said coating comprises a hydrogen concentration of about 32 %.

61. (Currently amended) The tubular structure of claim ~~[[49]]~~54 wherein said coating comprises a hydrogen concentration of about 32 %.

62. (Canceled).

63. (Currently amended) A tubular structure having an aspect ratio of about 6 or more and comprising an interior surface, said interior surface comprising a gaseous deposition product comprising a substantially uniform amorphous carbon coating having a thickness of about 2 micrometers or more, ~~The tubular structure of claim 45 comprising said interior surface,~~ wherein said interior surface comprises one or more metal and a sequential gradient ~~towards a center of said tubular structure comprising:~~

germanium chemically bonded to said metal, forming a metal-germanide;

germanium cohesively bonded to said metal-germanide;

carbon chemically bonded to said germanium, forming germanium -carbide; and

carbon cohesively bonded to said germanium -carbide forming said substantially uniform amorphous carbon coating.

64.-65. (Canceled)

66. (Currently amended) The tubular structure of claim ~~[[62]]63~~ wherein said amorphous carbon coating has a thickness of about 5 micrometers or more.

67. (Currently amended) The tubular structure of claim ~~[[62]]63~~ wherein said amorphous carbon coating has a thickness of about 15 micrometers or more.

68. (Canceled).

69. (Withdrawn, currently amended) The tubular structure of claim ~~[[98]]28~~ wherein said gaseous deposition product further comprises silicon.

70. (Withdrawn, currently amended) The tubular structure of claim ~~[[98]]28~~ wherein said gaseous deposition product further comprises chromium.

71. (Withdrawn, currently amended) The tubular structure of claim ~~[[98]]28~~ wherein said gaseous deposition product further comprises aluminum.

72. (Withdrawn, currently amended) The tubular structure of claim ~~[[98]]28~~ wherein said gaseous deposition product further comprises titanium.

73. (Currently amended) The tubular structure of claim ~~[[62]]45~~ wherein a gaseous precursor to said gaseous deposition product comprises a diffusion pump fluid selected from the group consisting of polyphenyl ether; elcosyl naphthalene; *i*-diamyl phthalate; *i*-diamyl sebacate; chlorinated hydrocarbons; *n*-dibutyl phthalate; *n*-dibutyl sebacate; 2-ethyl hexyl sebacate; 2-ethyl hexyl phthalate; di-2-ethyl-hexyl sebacate; tri-*m*-cresyl phosphate; tri-*p*-cresyl phosphate; and *o*-dibenzyl sebacate.

74.-77. (Canceled).

78. (Withdrawn, currently amended) The tubular structure of claim ~~[[98]]28~~ wherein ~~a gaseous precursor to said gaseous deposition product comprises~~ metala-metallic precursor.

79. (Withdrawn, currently amended) The tubular structure of claim 78 wherein said ~~metalliegaseous~~ precursor is selected from the group consisting of metal carbonyls, metal acetates, and metal alkanedionates.

80. (Withdrawn, currently amended) The tubular structure of claim 79 wherein said ~~metalliegaseous~~ precursor is metal pentanedionate.

81. (Withdrawn, currently amended) The tubular structure of claim 79 wherein said ~~metalliegaseous~~ precursor is selected from the group consisting of tetrakis(dimethylamino)titanium, chromium carbonyls (hexacarbonylchromium), vanadium carbonyls (hexacarbonylvandium carbonyl).

82. (Withdrawn) The tubular structure of claim 81 wherein said hexacarbonylvandium carbonyl is selected from the group consisting of erbium III acetate, yttrium 2,4- pentanedionate, erbium 2,4-pentanedionate, and N,N-(dimethylethanamine)-trihydridoaluminum.

83. (Withdrawn, currently amended) The tubular structure of claim ~~[[62]]~~45 wherein a gaseous precursor to said gaseous deposition product comprises silane.

84. (Withdrawn, currently amended) The tubular structure of claim ~~[[68]]~~83 wherein a gaseous precursor to said gaseous deposition product comprises trimethyl silane.

85. (Currently amended) The tubular structure of claim ~~[[64]]~~45 wherein said coating thickness comprises a uniformity of about +/- 20% or less along its length.

86. (Currently amended) The tubular structure of claim ~~[[65]]~~54 wherein said coating thickness comprises a uniformity of about +/- 20% or less along its length.

87. (Currently amended) The tubular structure of claim ~~[[6656]]~~ wherein said coating thickness comprises a uniformity of about +/- 20% or less along its length.

88. (Currently amended) The tubular structure of claim ~~[[6757]]~~ wherein said coating thickness comprises a uniformity of about +/- 20% or less along its length.

89. (Previously presented) The tubular structure of claim 85 wherein said coating comprises a nanohardness of about 15 GPa measured using a nano-indentation hardness tester.

90. (Previously presented) The tubular structure of claim 86 wherein said coating comprises a nanohardness of about 15 GPa measured using a nano-indentation hardness tester.

91. (Previously presented) The tubular structure of claim 87 wherein said coating comprises a nanohardness of about 15 GPa measured using a nano-indentation hardness tester.

92. (Previously presented) The tubular structure of claim 88 wherein said coating comprises a nanohardness of about 15 GPa measured using a nano-indentation hardness tester.

93.-108 (Canceled).